

## CLAIMS

1. A sun roof drive device for opening and closing a vehicle sun roof, comprising:
  - a DC brushless motor acting as a drive source;
  - a motor drive unit for switching drive voltage, which is applied to stator coils on the basis of a rotational position of a rotor detected by a magnetic sensor for detecting pole positions of a rotor magnet;
  - a control unit controlling the opening and closing actions of the vehicle sun roof, with said motor drive unit, on the basis of a detection signal of the magnetic sensor; and
  - a push-pull mechanism pushing and pulling a push-pull means, which is linked with said DC brushless motor by a speed reduction unit.
2. The sun roof drive device according to claim 1,
  - wherein the stator coils, which are respectively wound on stator teeth, are connected as 3-phase delta connection.
3. The sun roof drive device according to claim 1,
  - wherein said motor drive unit applies sinusoidal waves or pseudo-sinusoidal waves to the stator coils.
4. The sun roof drive device according to claim 1,
  - wherein said motor drive unit drives the motor by rectangular waves when high torque is required at a low rotational speed in order to reduce noise and drives the same by sinusoidal waves or pseudo-sinusoidal waves when low noise is required.
5. The sun roof drive device according to claim 1,

wherein a position of the vehicle sun roof is detected on the basis of detection signals of the magnetic sensor, which correspond to three or two of three phases; and said control unit performs arithmetic processing so as to control the position and a speed of the vehicle sun roof on the basis of a count signal, which is generated by counting rising edges and trailing edges of pulses of the pole detection signals.

6. The sun roof drive device according to claim 1,  
wherein said control unit detects jamming of the vehicle sun roof by controlling a speed of the vehicle sun roof.

7. The sun roof drive device according to claim 1,  
wherein said control unit controls the action of the vehicle sun roof and generation of rotary magnetic fields of said motor by one CPU.

8. The sun roof drive device according to claim 1,  
wherein said DC brushless motor is an inner rotor type motor, in which a motor shaft having the rotor magnet is capable of rotating in a space enclosed by a stator core, in which the stator coils are respectively wound on stator pole sections.

9. The sun roof drive device according to claim 1,  
wherein the rotor magnet is skew-magnetized or sinusoidal-magnetized in radial directions.